Computer Networks

Quanlong Li

Self-introduction

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Reference

- James F. Kurose and Keith W. Ross,Computer Networking-A Top-Down Approach (Fifth Edition)，高等教育出版社，2016.(Text Book)
- Andrew S. Tanenbaum and David J. Wetherall著,严伟、潘爱民译，计算机网络（第5版），清华大学出版社，2012
- William Stallings, Data & Computer Communications (Seventh Edition)，高等教育出版社，2006.
- Douglas E. Comer & David L. Stevens, INTERNETWORKING WITH TCP/IP-Vol. 1,Vol.2, Vol. 3, Tsinghua University Press, 1999,10.
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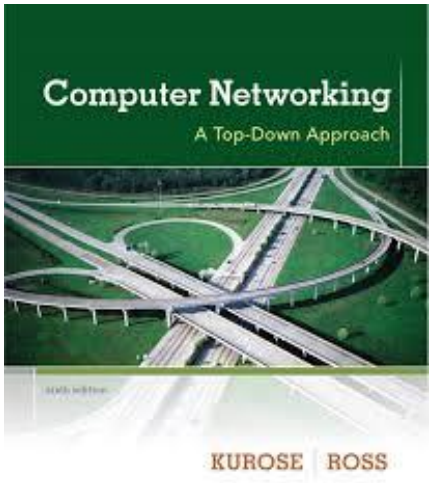
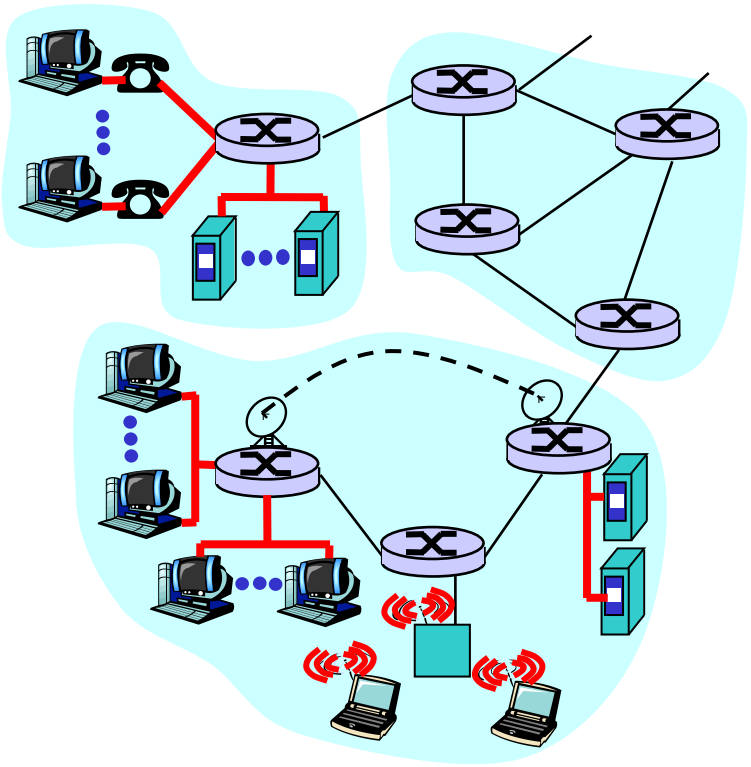


A top-down approach:

We'll cover networking top-down

- end-system applications, end-end transport
- network core: routing, hooking nets together
- link-level protocols, e.g., Ethernet
- other stuff: security, mobility, management,



Course Overview:

Part 1: Introduction *(5 classes, text: Chp 1)*

- what is a Computer Networks?
- What is a protocol?
- Network structure:network edge, network core, network access
- delay, loss in packet-switched networks
- protocol layers, service models
- Internet backbones, NAPs and ISPs
- brief history of networking, Internet

Course Overview:

Part 2: Application Layer *(5 classes, text: Ch. 2)*

- principles of application-layer protocols
- World Wide Web: HTTP
- file transfer: FTP
- electronic mail in the Internet
- the Internet's directory service: DNS
- P2P applications
- socket programming

Course Overview:

Part 3:Transport Layer *(7 classes, text Ch. 3)*

- Transport-layer services and principles
- Multiplexing and demultiplexing applications
- Connectionless transport: UDP
- Principles of reliable of data transfer
- TCP case study
- Principles of congestion control
- TCP congestion control

Course Overview:

Part 4: Network Layer *(9 classes, text: Ch. 4)*

- introduction and network service model
- what's inside a router?
- routing principles (algorithms)
- hierarchical routing
- IP: the Internet Protocol
- IP addressing, subnet, route table
- Internet routing: RIP, OSPF, BGP

Course Overview:

Part 5:Link Layer, LANs *(6 classes, text:Ch. 5)*

- introduction, services
- error detection, correction
- multiple access protocols, LANs
- LAN addresses, ARP
- Ethernet
- HDLC, PPP

Course Overview:

Part 6: The Physical Layer (2 classes)

- Data Transmission
  - Terminology
- Data Encoding
  - Encoding Techniques
  - Digital Data, Digital Signal
  - Encoding Schemes
- Transmission Media
- The Data Communications Interface
  - Asynchronous and Synchronous Transmission
  - Interfacing

Course Overview:

Part 7: Wireless and Mobile Networks (4 classes, Ch 6)

- wireless link characteristics
- the wireless link:
  - 802.11
  - cellular Internet access
  - mobility principles
- mobility in practice:
  - mobile IP
  - mobility in cellular networks

Course Overview:

Part 8: Network Security *(2 classes, text: Ch. 8)*

- what is network security?
- principles of cryptography
- authentication: Who are you?
- integrity
- key distribution, certification
- firewalls
- attacks, countermeasures

Assessment

- MOOC/SPOC -~20%
  - MOOC：http://www.icourse163.org/course/hit-154005
  - SPOC：http://www.icourse163.org/spoc/learn/HIT-1001720004?tid=1002209008
- Quizzes in class-~10%
- Experiment-~10%
- Final examination-~60%

Now let's go!